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Performance Oriented Packaging Testing of Container, Shipping and Storage for the Mk 70 Mod 0 Explosive Charge Kit for Packing Group II Solid Hazardous Materials

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6. AUTHOR(S)

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13. ABSTRACT (Maximum 200 words)

This Performance Oriented Packaging (POP) test was conducted to ascertain whether the Shipping and Storage Container for the Mk 70 Mod 0 Explosive Charge Kit meets the Packing Group II requirements specified by the Code of Federal Regulations, Title 49 CFR, Parts 107 through 178, dated 31 December 1991. The packaged commodity used for the test was an inert practice explosive charge kit weighing 30 kg (65 pounds) and a weighted load simulating an additional explosive charge kit. This represents the current maximum commodity weight. To compensate for future growth variations in commodity and/or packaging, 9 kg (19 pounds) were added. Gross weight of the loaded container was 100 kg (220 pounds). The test results indicate that the container has conformed to the POP requirements.

14. SUBJECT TERMS

POP Test of Shipping and Storage Container for the Mk 70 Mod 0 Explosive Charge Kit

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PERFORMANCE ORIENTED PACKAGING TESTING OF CONTAINER, SHIPPING AND STORAGE, FOR MK 70 MOD 0 EXPLOSIVE CHARGE KIT FOR PACKING GROUP II SOLID HAZARDOUS MATERIALS

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October 1992

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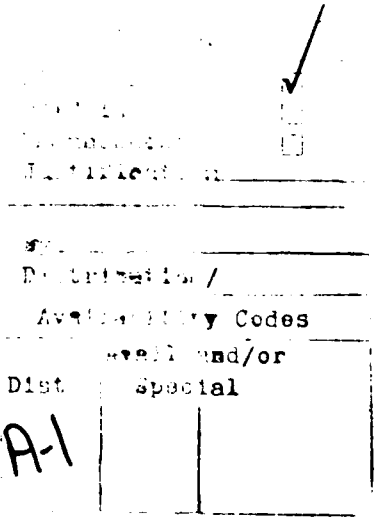

INTRODUCTION

This Performance Oriented Packaging (POP) test was performed to ascertain whether the Shipping and Storage Container for the Mk 70 Mod 0 Explosive Charge Kit meets the Packing Group II requirements specified by the Code of Federal Regulations, Title 49 CFR, Parts 107 through 178, dated 31 December 1991. The packaged commodity used for the test was an inert practice explosive charge kit weighing 30 kg (65 pounds) and a weighted load simulating an additional explosive charge kit. This represents the current maximum commodity weight. To compensate for future growth variations in commodity and/or packaging, 9 kg (19 pounds) were added. Gross weight of the loaded container was 100 kg (220 pounds).

Due to unavailability only one container was used for testing. This is less than the number required by the regulations. Approval for this deviation has been granted by the Under Secretary of Defense, Memorandum for the Joint Logistics Commanders dated 22 February 1990.

TESTS PERFORMED

1. Base Level Vibration Test

This test was performed in accordance with Title 49 CFR, Part 178, Subpart M, Sec. 178.608. The container was placed on a repetitive shock platform which has a vertical linear motion of 1-inch double amplitude. Movement of the container was restricted during vibration in all but the vertical direction. The frequency of the platform was increased until the container left the platform 1/16 of an inch at some instant during each cycle. Test time was 1 hour.

2. Stacking Test

This test was performed in accordance with Title 49 CFR, Part 178, Subpart M, Sec. 178.606. The container was subjected to a force applied to its top surface equivalent to the total weight of identical packages stacked to a minimum height of 3 meters (including the test container). A weight of 379 kg (836 pounds) was stacked on the test container. The test was performed for 24 hours. The weight was then removed and the container examined.

3. Drop Test

This test was performed in accordance with Title 49 CFR, Part 178, Subpart M, Sec. 178.603. Six drops were performed from a height of 1.2 meters (4 feet) in the following orientations (three drops for each orientation):

a. Horizontally on the side.

b. Diagonally on the edge between the cover assembly and the top ring of the container.

PASS/FAIL

1. Base Level Vibration Test

The criteria for passing the base level vibration test is outlined in Title 49 CFR, Sec. 178.608(c): No test sample should show any deterioration which could adversely affect transportation safety or any distortion liable to reduce packaging strength.

2. Stacking Test

The criteria for passing the stacking test is outlined in Title 49 CFR, Sec. 178.606(d): No test sample may show any deterioration which could adversely affect transportation safety or any distortion likely to reduce its strength, cause instability in stacks of packages, or cause damage to inner packagings likely to reduce safety in transportation.

3. Drop Test

The criteria for passing the drop test is outlined in Title 49 CFR, Sec. 178.603(f): A package is considered to successfully pass the drop tests if for each sample tested, no rupture occurs which would permit spillage of loose explosive substances or articles from the outer packaging.

TEST RESULTS

1. Base Level Vibration Test

Satisfactory.

2. Stacking Test

Satisfactory.

3. Drop Test

Satisfactory.

DISCUSSION

1. Base Level Vibration Test

The input vibration frequency was 3.6 Hz. Immediately after the vibration test was completed, the container was removed from the platform, turned on its side and inspected. No unfavorable distortion or deterioration was observed.

2. Stacking Test

The container was inspected after the 24-hour period was over. No unfavorable distortion or deterioration was observed.

3. Drop Test

After each drop, the container was inspected. The contents were completely retained by the container.

REFERENCE MATERIAL

A. Code of Federal Regulations, Title 49 CFR, Parts 107-178.

B. Bureau of Explosives Tariff No. BOE 6000K Hazardous Materials Regulations of the Department of Transportation by Air, Rail, Highway, Water including Specifications for Shipping Containers.

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TEST DATA SHEET

POP MARKING: UN 1A2/Y100/S/**/USA/DOD/NAD **YEAR LAST PACKED OR MANUFACTURED	
Container: Shipping and Storage Container for Mk 70 Mod 0 Explosive Charge Kit	
Type: 1A2	**Container P/N or NSN:** NSN 6T 1350-01-297-9048
Drawing Number: 5917205	**Outer Packaging Material:** Steel
Dimensions: 24" dia x 30" H	**Gross Weight:** 100 kg (220 pounds)
Closure (Method/Type): Locking Ring	**Tare Weight:** 33 kg (71 pounds)
Additional Description: MS Drum	

PACKAGED COMMODITY:		
Name: See table 1	**NSN(s):** See table 1	
United Nations Number: See table 1		
United Nations Packing Group: II		
Physical State (Solid, Liquid, or Gas): Solid		
Vapor Pressure (Liquids Only): N/A	**At 50 °C:** N/A	**At 55 °C:** N/A
Consistency/Viscosity: N/A	**Density/Specific Gravity:** N/A	
Amount Per Container: See table 1	**Flash Point:** N/A	
Net Weight: See table 1		

PACKAGED COMMODITY USED FOR TEST:	
Name: 1 inert practice explosive charge kit and dummy load	**Physical State:** Solid
Consistency: N/A	**Density/Specific Gravity:** N/A
Test Pressure (Liquids Only): N/A	**Net Weight:** 68 kg (149 pounds)
Additional Description: The net weight (two items) includes the current maximum commodity weight plus an additional 9 kg (19 pounds).	

N/A = Not Applicable

TABLE 1
Commodities Approved for Shipping in the Shipping and Storage Container for the Mk 70 Mod 0 Explosive Charge Kit

NALC/ DODIC	NSN	Commodity Nomenclature	Packing Drawing Number	Haz Class/Div	UN Number	Units/ Cntr	Total Net Weight (lb)	Total Gross Weight (lb)
9W23	1351-01-185-7447	Kit, Control Unit, Mk 126	5917207	1.1D	0408	1	90	161
9W24	1351-01-185-7448	Kit, Charge, Explosive, Mk 70	5917205	1.1D	0137	2	130	201